WHAT IS CLAIMED:

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A method of reducing damage resulting from
1
   environmental electromagnetic effects on a non-metallic
2
   surface, said method comprising:
3
             disposing a polymeric sheet material over the
4
  non-metallic surface; and
5
             disposing a metal layer between the non-
6
  metallic surface and the polymeric sheet material.
                  A method according to claim 1, wherein the
1
  non-metallic surface is the surface of an ungrounded
  object.
3
                  A method according to claim 1, wherein the
1
  object is an aircraft or a marine vessel.
2
                 A method according to claim 1, wherein the
1
  polymeric sheet material comprises a polymer selected
2
  from the group consisting of polyolefins, polyimides,
3
   polyesters, polyacrylates, halopolymers, and combinations
   thereof.
5
                  A method according to claim 1, wherein the
1
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1 6. A method according to claim 1, wherein the 2 polymeric sheet material is a halopolymer fabric.

polymeric sheet material is a polymeric fabric.

1

3

4

5

A method according to claim 1, wherein the polymeric sheet material is a fluoropolymer fabric.

A method according to claim 1, wherein 1 said disposing comprises: 2

adhering the polymeric sheet material directly 3 to the non-metallic surface. 4

9. A method according to claim 1, wherein the · 1 metal layer is a metal mesh or an expanded metal foil. 2

10. A method according to claim 1/ wherein the metal layer is bonded to the polymeric sheet material and 2 wherein said disposing a polymeric sheet material and said disposing a metal layer are carried out in a single step.

A method according to claim 10, wherein 1 the polymeric sheet material is a halopolymer sheet 2 material and wherein the metal layer is bonded to the 3 polymeric sheet material by a method comprising: substituting at least a portion of halogen 5 atoms on the outermost surface of the halopolymer sheet 6 material with hydrogen and oxygen or oxygen-containing 7 groups to thus provide an oxyhalopolymer sheet material; 9 and

contacting the oxyhalopolymer sheet material 10 with a solution or gas comprising a metal for a period of 11 time sufficient to facilitate bonding of the metal to the 12 oxyhalopolymer sheet material. 13

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A method according to claim 10, wherein
    the polymeric sheet material's surface comprises
    functional groups which will bind an electroless
 3
   metallization catalyst and wherein the metal layer is
4
   bonded to the polymeric sheet material by a method
 6
   comprising:
              contacting the polymeric sheet material's
 7
   surface's functional groups with an electroless
8
   metallization catalyst to obtain a catalytic surface; and
9
              contacting the catalytic surface with an
10
   electroless metallization solution under conditions
11
   effective to metallize the polymeric sheet material's
   surface.
                 A method according to claim 10/ wherein
1
  the metal layer is adhered directly to the non-metallic
   surface with an adhesive.
              14. A method according to claim 1 / wherein the
1
   polymeric sheet material is a first polymeric sheet
2
   material and wherein said method further comprises:
3
             disposing a second polymeric sheet material
4
   over the first polymeric sheet material.
5
             15. A method according to claim 1/4, wherein
1
   said method further comprises:
2
              disposing a second metal layer between the
3
   first polymeric sheet material and the second polymeric
4
   sheet material.
5
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A method according to claim 15, wherein
1
   said method further comprises:
2
             disposing a third polymeric sheet material over
3
   the second polymeric sheet material; and
4
             disposing a third metal layer between the
5
   second polymeric sheet material and the third polymeric
6
   sheet material.
             17 A method according to claim 1, wherein the
1
  environmental electromagnetic effect is a lightning
2
  strike.
3
             18. An object comprising:
1
             a substrate having a non-metallic surface;
2
             a halopolymer sheet material disposed over said
3
  substrate's non-metallic surface; and
             a metal layer disposed between said halopolymer
5
  sheet material and said substrate's non-metallic surface.
6
             19. An object according to claim 18, wherein
1
2 said substrate is ungrounded.
             20. An object according to claim 18, wherein
1
  said substrate is an aircraft or a marine vessel.
                  An object according to claim 18 wherein
1
  said halopolymer sheet material is a halopolymer fabric.
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An object according to claim 18, wherein
1
   said halopolymer sheet material is a fluoropolymer
2
   fabric.
3
                  An object according to claim 18 wherein
1
   said metal layer is adhered directly to said substrate's
2
   non-metallid surface with an adhesive.
3
                  An object according to claim 18, wherein
1
   said metal layer is a metal mesh or an expanded metal
2
3
   foil.
             25. An object according to claim 18 / wherein
1
   said metal layer is adhered to said halopolymer sheet
2
  material.
                 An object according to claim 1/8, wherein
1
   said metal layer is bonded to said halopolymer sheet
2
  material.
3
             27. An object according to claim 26, wherein
1
   said metal layer is bonded to said halopolymer sheet
2
  material by a method comprising:
3
             substituting at least a portion of halogen
4
   atoms on said halopolymer sheet material's outermost
5
   surface with hydrogen and oxygen or oxygen-containing
6
   groups to thus provide an oxyhalopolymer sheet material;
7
   and
8
             contacting the oxyhalopolymer sheet material
9
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with a solution or gas comprising a metal for a period of

13

surface.

11 time sufficient to facilitate bonding of the metal to the 12 oxyhalopolymer sheet material.

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28. An object according to claim 26, wherein
 1
   said halopolymer sheet material's surface comprises
 2
   functional groups which will bind an electroless
 3
   metallization catalyst and wherein said metal layer is
   bonded to said halopolymer sheet material by a method
 5
6
   comprising:
              contacting said halopolymer sheet material's
7
   surface's functional groups with an electroless
8
   metallization catalyst to obtain a catalytic surface; and
9
              contacting the catalytic surface with an
10
   electroless metallization solution under conditions
11
   effective to metallize said halopolymer sheet material's
12
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- 29. An object according to claim 26, wherein 2 said metal layer is adhered directly to said substrate's 3 non-metallic surface with an adhesive.
- 30. An object according to claim 26, wherein 2 said halopolymer sheet material is a halopolymer fabric.
- 31. An object according to claim 26, wherein 2 said halopolymer sheet material is a fluoropolymer 3 fabric.
- 1 32. An object according to claim 18 further 2 comprising:

material.

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a polymeric sheet material disposed over said
   halopolymer sheet material.
                  An object according to claim 32 further
1
   comprisind:
2
             a second metal layer disposed between said
3
   halopolymer sheet material and said polymeric sheet
4
   material.
5
             34. An object according to claim 33, wherein
1
   said polymeric sheet material is a first polymeric sheet
   material and wherein said object further comprises:
3
             a second polymeric sheet material disposed over
4
   said first polymeric sheet material; and
5
             a third metal layer disposed between said first
6
  polymeric sheet material and said second polymeric sheet
7
   material.
1
             35. A laminate comprising:
             a metal layer having a first surface and a
2
   second surface;
3
             a halopolymer sheet material bonded or adhered
4
   to the first surface of said metal layer; and
5
             an adhesive disposed on the second surface of
6
   said metal layer.
7
                  A laminate according to claim 35,
1
   said halopolymer sheet material is a fluoropolymer sheet
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37. A laminate according to claim 35, wherein
   said halopolymer sheet material is a halopolymer fabric.
              38. A laminate according to claim 35, wherein
 1
    said halopolymer sheet material is a fluoropolymer
 2
    fabric.
 3
              39. A laminate according to claim 35, wherein
 1
   said metal layer's first surface is bonded to said
 2
 3
   halopolymer sheet material.
              40. A laminate according to claim 39 wherein
 1
    said metal layer's first surface is bonded to said
 2
   halopolymer sheet material by a method comprising:
 3
              substituting at least a portion of halogen
 4
   atoms on said halopolymer sheet material's outermost
 5
   surface with hydrogen and oxygen or oxygen-containing
 6
   groups to thus provide an oxyhalopolymer sheet material;
 7
8
    and
              contacting the oxyhalopolymer sheet material
9
   with a solution or gas comprising a metal for a period of
10
    time sufficient to facilitate bonding of the metal to the
11
    oxyhalopolymer sheet material.
12
              41. A laminate according to claim 39, wherein
1
   said halopolymer sheet material's surface comprises
2
   functional groups which will bind an electroless
3
   metallization catalyst and wherein said metal layer's
4
    first surface is bonded to said halopolymer sheet
5
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material by a method comprising:

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halopolymer fabric.

ontacting said halopolymer sheet material's 7 surface's functional groups with an electroless 8 metallization catalyst to obtain a catalytic surface; and contacting the catalytic surface with an 10 electroless metallization solution under conditions 11 effective to metallize said halopolymer sheet material's 12 surface. 13 A laminate comprising: 14 42. a halopolymer fabric having a first surface and 15 a second surface; 16 a metal layer bonded or adhered to the first 17 surface of said halopolymer fabric; and 18 an adhesive disposed on the second surface of 19 said halopolymer fabric. 20 A laminate according to claim 42, wherein 1 said halopolymer fabric is a fluoropolymer fabric. 2 A laminate according to claim 42, wherein 1 said metal layer bonded to the first surface of said 2